

WHAT IS CLAIMED IS:

1. A method of fabricating a hollow mechanical part by diffusion welding and superplastic forming, the method comprising the following steps:

- 5 a) providing at least two primary parts of superplastic material, said primary parts having two faces and a periphery;
- b) providing an anti-diffusion substance and depositing said anti-diffusion substance in a predefined
10 pattern on at least one face of said two faces of said primary parts;
- c) assembling said primary parts together at their said periphery, with the exception of a passage-forming location, said primary parts forming a stack and defining
15 between them a cavity, said at least one face being placed facing into said cavity;
- d) diffusion welding the stack under isostatic pressure;
- d) placing the welded assembly in a mold; and
- 20 f) raising said mold to the superplastic forming temperature and injecting an inert gas at the superplastic forming pressure via said passage into said cavity, thereby causing the stack to inflate and implementing superplastic forming, enabling a blank of
25 the mechanical part to be obtained;
- wherein step b) is performed in application of the following sequence of operations:
 - b1) applying a layer of anti-diffusion substance comprising a powder over the entire surface of said at
30 least one face of the primary parts;
 - b2) localized sintering of the anti-diffusion substance in said predefined pattern by the heating that results from localized application of a laser beam along a track made up of at least one zone, thereby producing,
35 in said at least one zone, both bonds between the particles of powder and also a diffusion phenomenon

between the particles of powder and the material of said at least one face of the primary part; and

b3) removing the anti-diffusion substance from the regions that are not subjected to the laser beam.

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2. A method of fabrication according to claim 1, wherein said anti-diffusion substance comprises said powder and a binder, and wherein said powder is an anti-diffusion filler constituted by a refractory material comprising at least one of the materials belonging to the group constituted by: yttrium oxide; alumina; graphite; and boron nitride; or any other powder made of a material that is compatible with the superplastic material.

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3. A method of fabrication according to claim 1, wherein said anti-diffusion filler is a yttrium oxide powder with particles presenting a mean size of less than 50 μm .

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4. A method of fabrication according to claim 1, wherein said binder is water.

5. A method of fabrication according to claim 1, wherein step b1) of applying a layer of anti-diffusion substance is performed by spraying.

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6. A method of fabrication according to claim 1, wherein step b2) of sintering is performed under an atmosphere of inert gas, preferably under an atmosphere of argon.

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7. A method of fabrication according to claim 1, wherein step b3) of removing substance is performed by washing, or by any other mechanical action such as brushing.

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8. A method of fabrication according to claim 1, wherein said laser is moved by a computer-controlled drive system.

9. A method of fabrication according to claim 8, wherein, for each zone, said drive system begins the path of the corresponding portion of the track inside said zone.

- 5 10. A method of fabrication according to claim 1, wherein said mechanical part is a hollow blade for a turbomachine, in particular a fan rotor blade, and wherein in step a), three primary parts are provided comprising a suction side primary part, a central sheet,
10 and a pressure side primary part.